

CLAIMS

1. A process for wet oxidation of a feedstock comprising at least one non-volatile oxidisable material, which process includes at least the steps of:
 - 5 (a) continuously introducing the feedstock into a reactor;
 - (b) contacting the feedstock at temperature and pressure with an oxidant in the presence of a catalyst to produce a vapour phase comprising at least some oxidation products and a liquid phase; and
 - 10 (c) continuously removing at least some of the vapour phase comprising at least some oxidation products from the reactor while retaining the liquid phase in the reactor.
2. A process as claimed in claim 1 wherein the feedstock is an aqueous liquid, solution, suspension, colloid, emulsion or other mixture.
- 15 3. A process as claimed in claim 1 or claim 2 wherein the feedstock comprises a slurry formed from substantially dry material to which is added an aqueous liquid.
4. A process as claimed in any one of claims 1 to 3 wherein the oxidisable material
20 comprises less than about 10% by weight of the feedstock.
5. A process as claimed in any one of claims 1 to 4 wherein the oxidisable material comprises a mixture of substances.
- 25 6. A process as claimed in any one of claims 1 to 5 wherein the oxidisable material is a waste product.
7. A process as claimed in claim 6 wherein the waste product is industrial waste, consumer waste or a component thereof.
- 30 8. A process as claimed in claim 6 or claim 7 wherein the oxidisable material is waste selected from the group consisting of: dairy shed waste; pig and chicken waste; milk processing plant waste; milk, cheese and butter vat wash downs; food

processing waste; waste from the wine industry and brewing industry; food waste; shipboard waste; waste in environmentally sensitive locations; waste from the wash downs and oil-traps of petroleum service stations and garages; waste fats and proteins from the meat processing industry; wool-scouring waste; sewage; medical waste; fibre, ink and polymeric material from the deinking waste produced in the recycling of paper; waste paper and paper products; waste from the wood processing industry including waste wood and wood products, wood fibre, saw dust and wood treated with preservatives; rubber waste; plastic waste; and tannin and colorants from wood pulping streams.

9. A process as claimed in any one of claims 1 to 8 wherein the process is applied to the reclamation of sites contaminated by organic materials.

10. A process as claimed in claim 9 wherein said site is selected from the group consisting of: petrochemical works; gas works; timber treatment sites; and agrochemical sites.

11. A process as claimed in any one of claims 1 to 7 wherein the oxidisable material comprises an organic substance.

12. A process as claimed in claim 11 wherein the organic substance is selected from the group consisting of: lipids; proteins; carbohydrates; mineral oils; vegetable oils; waxes; and hydrocarbons.

13. A process as claimed in claim 12 wherein the organic substance is a carbohydrate selected from starch and cellulose.

14. A process as claimed in any one of claims 1 to 13 wherein the oxidisable material includes one or more oxidisable inorganic compounds.

15. A process as claimed in any one of claims 1 to 14 wherein the oxidant is selected from the group consisting of: air; oxygen; ozone; peroxide; and mixtures thereof.

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16. A process as claimed in claim 15 wherein the oxidant is selected from the group consisting of: air; oxygen; and peroxide.
- 5 17. A process as claimed in any one of claims 1 to 16 wherein the temperature is between about 100°C and about 350°C.
18. A process as claimed in any one of claims 1 to 17 wherein the temperature is between about 190°C and about 300°C.
- 10 19. A process as claimed in any one of claims 1 to 18 wherein the temperature is between about 190°C and about 280°C.
20. A process as claimed in any one of claims 1 to 19 wherein the temperature is between about 190°C and about 210°C.
- 15 21. A process as claimed in any one of claims 1 to 19 wherein the temperature is between about 220°C and about 240°C.
22. A process as claimed in any one of claims 1 to 21 wherein the pressure is between about 0.7 MPa and about 17.2 MPa.
- 20 23. A process as claimed in any one of claims 1 to 22 wherein the pressure is between about 1.4 MPa and about 13.0 MPa.
- 25 24. A process as claimed in any one of claims 1 to 23 wherein the pressure is between about 2.0 MPa and about 3.5 MPa.
25. A process as claimed in any one of claims 1 to 24 wherein the pressure is between about 2.1 MPa and about 2.9 MPa.
- 30 26. A process as claimed in any one of claims 1 to 24 wherein the pressure is between about 2.9 MPa and about 3.4 MPa.

27. A process as claimed in any one of claims 1 to 26 wherein the catalyst is a homogenous catalyst.
- 5 28. A process as claimed in any one of claims 1 to 27 wherein the catalyst is selected from the group consisting of the transition metal ions and mixtures thereof.
29. A process as claimed in any one of claims 1 to 28 wherein the catalyst is selected from the group consisting of: copper (II) ions; iron (II) ions; manganese (II) ions; and mixtures thereof.
- 10 30. A process as claimed in any one of claims 1 to 29 wherein the catalyst is copper (II) ions.
- 15 31. A process as claimed in any one of claims 1 to 30 wherein the vapour phase is removed from the reactor by flash vaporisation.
32. A process as claimed in any one of claims 1 to 31 further including the step of reducing the temperature and pressure of the vapour phase to recover at least one oxidation product.
- 20 33. A process as claimed in claim 32 wherein the oxidation product is selected from the group consisting of: carbon dioxide; formic acid; acetic acid; higher organic acids; and mixtures thereof.
- 25 34. A process as claimed in claim 32 or claim 33 wherein the oxidation product is selected from the group consisting of: acetic acid; formic acid; carbon dioxide and mixtures thereof.
- 30 35. An oxidation product when produced by a process as claimed in any one of claims 32 to 34.
36. A process as claimed in any one of claims 1 to 34 further comprising the step of recovering at least one non-volatile salt from the liquid phase.

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37. A process as claimed in claim 36 wherein the non-volatile salt is recovered as a concentrated solution or a precipitate.

5 38. A process as claimed in claim 36 or claim 37 wherein the non-volatile salt is an inorganic wood preservative.

39. A non-volatile salt when produced by a process as claimed in any one of claims 36 to 38.